

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of: Sato et al.

Group Art Unit: 1711

Serial No.: To be assigned

Examiner: Sergent, R.

Filed:

Docket No.: Docket: 11301-1481

For: PROCESS FOR THE PREPARATION OF  
URETHANE RESINS AND URETHANE RESIN  
COMPOSITIONS

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Mary N. Kilgore EL 789316864 US  
Signature/Mary N. Kilgore

**PRELIMINARY AMENDMENT  
TO DIVISIONAL APPLICATION**

Assistant Commissioner for Patents  
Washington, DC 20231

Sir:

This is a preliminary amendment to newly filed divisional non-provisional patent application. The parent application is Serial No. 09/242,525, filed 02/17/99. Applicant submits the following preliminary amendments and remarks to be respectively entered in the new divisional application and considered prior to examination.

## In the Claims

Please cancel claims 1 – 45 without waiver, disclaimer, or prejudice.

Please enter the following new claims:

46. The process for the preparation of urethane resins comprising the steps of:

(1) reacting a compound (compound(ab)) having at least one active hydrogen being reactive with an isocyanate group in one molecule and having 1 to 10 silicon atoms directly bonded to a hydrolyzable group selected from alkoxy and acetoxy groups, with a compound selected from the group consisting of: a compound(l) obtained by reacting a compound(j) having at least two isocyanate groups with a compound(k) having one to two active hydrogens being reactive with an isocyanate group, a monoisocyanate compound (compound(m)), and a compound(i) selected from the group consisting of an  $\alpha$ ,  $\beta$ -unsaturated carbonyl compound and an  $\alpha$ ,  $\beta$ -unsaturated nitrile compound, in order to produce a product(N) having less than two active hydrogens being reactive with an isocyanate group in one molecule;

(2) reacting said product(N), with a compound selected from the group consisting of said compound(j) and a compound(bb) having at least 1.1 isocyanate groups in one molecule, in order to obtain a silicon compound (product(O)) having less than two isocyanate groups and having a hydrolysable group selected from alkoxy and acetoxy groups directly bonded to at least one silicon atom, wherein said compound(bb) is obtained by reacting said compound(j) with said compound(k);

(3) reacting said product(O), with a compound or product selected from the group consisting of: a polyol compound (compound(c)), a polythiol compound (compound(c-1)), a compound(cd) having at least one selected from the group consisting of a primary and secondary amino group, a product(C) having an average molecular weight of 100-25000 and having at least 0.2 terminal secondary amino groups in one molecule, and a product(L) being a polymer, wherein said product(C) is obtained by reacting a compound(e) having an organic group(II) selected from the group consisting of amino and acryloyl groups and having an average molecular weight of 100-25000, with a compound(f) being capable of reacting with said organic group(II) to form a secondary amine compound, wherein said product (L) is obtained by polymerizing at least one selected from the group consisting of: a (meta)acryloyl group-containing monomer, a hydroxy

group-containing (meta)acrylate, and a silicon compound (compound(y)), said compound(y) having a hydrolyzable group which is selected from the group consisting of an alkoxy and acetoxy group directly bonded to 1 to 10 silicon atoms and having a (meta)acryloyl group, in the presence of a compound selected from the group consisting of: said compound(c), said compound(c-1) and said product(C).

47. The process for the preparation of urethane resins according to claim 46, wherein said compound(ab) has further at least one selected from the group consisting of primary amino, secondary amino, mercapto and hydroxy groups, and wherein said compound(k) is selected from the group consisting of monoalcohol, monoprimay amine, monosecondary amine and monothiol compound.

48. The process for the preparation of urethane resins comprising the steps of:

(1) reacting a compound(eb) with a compound(fb), or after reacting said compound(eb) with said compound(fb), further reacting with a compound selected from the group consisting of a compound(l), compound(m) and compound(i), in order to obtain a silicon compound (product(R)) having a hydrolyzable group directly bonded to at least one silicon atom and having less than two secondary amino groups, wherein, said compound(eb) is a silicon compound having at least one acryloyl group (organic group(VIII) ) and having at least one hydrolyzable group selected from the group consisting of alkoxy and acetoxy groups bonded to at least one silicon atom, wherein, said compound(fb) is capable of reacting with said organic group(VIII) to form a secondary amino compound, wherein, said compound(l) has less than two isocyanate groups and is obtained by reacting a compound(j) having at least two isocyanate groups with a compound(k) having one to two active hydrogens being reactive with an isocyanate group, wherein, said compound(m) is a monoisocyanate compound, and wherein, said compound(i) is selected from the group consisting of an  $\alpha$ ,  $\beta$ -unsaturated carbonyl compound and an  $\alpha$ ,  $\beta$ -unsaturated nitrile compound;

(2) reacting said product(R), with said compound(j) or a compound(bb) having at least 1.1 isocyanate groups in one molecule and being obtained by reacting said compound(j) with said compound(k), in order to produce a silicon compound (product(S)) having at least one hydrolyzable group directly bonded to at least one silicon atom and having less than two isocyanate groups;

(3) reacting said product(S), with at least one selected from the group consisting of: a polyol compound (compound(c)), a polythiol compound(compound(c-1)), a compound(cb), a product(C), and a product(L), wherein, said compound(cb) has at least one primary amino or secondary amino group in one molecule, wherein, said product(C) has an average molecular weight of 100 to 25000, has at least 0.2 terminal secondary amino groups and is obtained by reacting a compound(e) having a organic group(II) selected from the group consisting of amino and acryloyl groups and having an average molecular weight of 100-25000, with a compound(f) being capable of reacting with said organic group(II) to form a secondary amine compound, and wherein, said product(L) is produced by polymerizing at least one selected from the group consisting of: a (meta)acryloyl group-containing monomer, a hydroxy group-containing (meta)acrylate, and a silicon compound (compound(y)) having a hydrolysable group selected from alkoxy and acetoxy directly bonded to 1 to 10 silicon atoms and having a (meta)acryloyl group, in the presence of a compound selected from the group consisting of said compound(c), said compound(c-1) and said product(C).

49. The process for the preparation of the urethane resins according to claim 48, wherein said compound(eb) is a compound having at least one acryloyl group as said organic group(VIII), the said compound(fb) is a compound having at least one selected from the group consisting of a primary amino and secondary amino group.

50. A process for the preparation of urethane resins comprising the steps of:

(1) reacting a compound(ib), with a compound selected from the group consisting of a compound(j) and compound(bb) , in order to produce a product(V) having less than two isocyanate groups and having at least one hydrolysable group directly bonded to a silicon atom, wherein, said compound(ib) has a hydrolysable group selected from the group consisting of alkoxy and acetoxy groups directly bonded to at least one silicon atom and has one group(XI) selected from the group consisting of primary amino and secondary amino groups, wherein, said compound(j) has at least two isocyanate groups, wherein, said compound(bb) has at least 1.1 isocyanate groups and is obtained by reacting said compound (j) with a compound(k) having one to two active hydrogens being reactive with an isocyanate group in one molecule;

(2 ) reacting said product(V), with a compound selected from a group consisting of: a compound(c), a compound(c-1), a compound(cb), a product(C) and product(L), wherein, said compound(c) is a polyol compound, wherein, said compound(c-1) is a polythiol compound, wherein, said compound(cb) has at least one selected from the group consisting of primary amino and secondary amino groups in one molecule, wherein, said product(C) has an average molecular weight of 100 to 25000, has at least 0.2 terminal secondary amino groups in one molecule and is obtained by reacting a compound(e) having an organic group(II) selected from the group consisting of amino and acryloxy groups and having an average molecular weight of 100-25000, with a compound(f) being capable of reacting with said organic group(II) to form a secondary amine compound, and

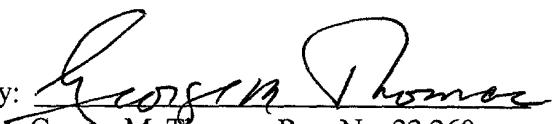
wherein, said product(L) is a polymer, is obtained by polymerizing at least one selected from the group consisting of: a (meta)acryloyl group-containing monomer, a hydroxy group-containing (meta)acrylate, and a silicon compound (compound(y)) having at least a (meta)acryloyl group and having a hydrolysable group selected from the group consisting of alkoxy and acetoxy groups directly bonded to 1 to 10 silicon atoms, in the presence of a compound selected from the group consisting of said compound(c), said compound(c-1) and said product(C).

**CONCLUSION**

In light of the foregoing amendments, Applicants respectfully submit that claims 46-50 are in condition for allowance. Favorable consideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

Respectfully submitted ,

By:



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